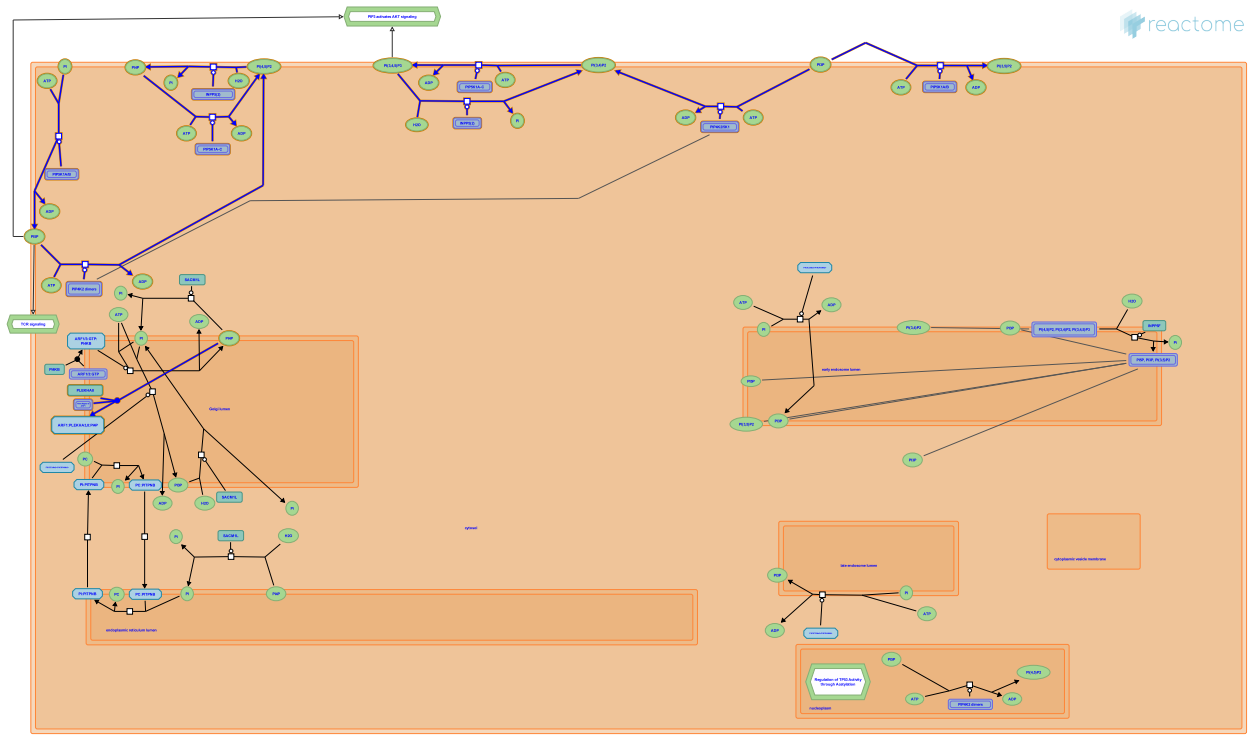


# Synthesis of PIPs at the plasma membrane



European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of [Creative Commons Attribution 4.0 International \(CC BY 4.0\) License](https://creativecommons.org/licenses/by/4.0/). For more information see our [license](https://creativecommons.org/licenses/by/4.0/).

## Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

The development of Reactome is supported by grants from the US National Institutes of Health (P41 HG003751), University of Toronto (CFREF Medicine by Design), European Union (EU STRP, EMI-CD), and the European Molecular Biology Laboratory (EBI Industry program).

## Literature references

- Fabregat, A., Sidiropoulos, K., Viteri, G., Forner, O., Marin-Garcia, P., Arnau, V. et al. (2017). Reactome pathway analysis: a high-performance in-memory approach. *BMC bioinformatics*, 18, 142. [↗](#)
- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
- Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res*, 46, D649-D655. [↗](#)
- Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

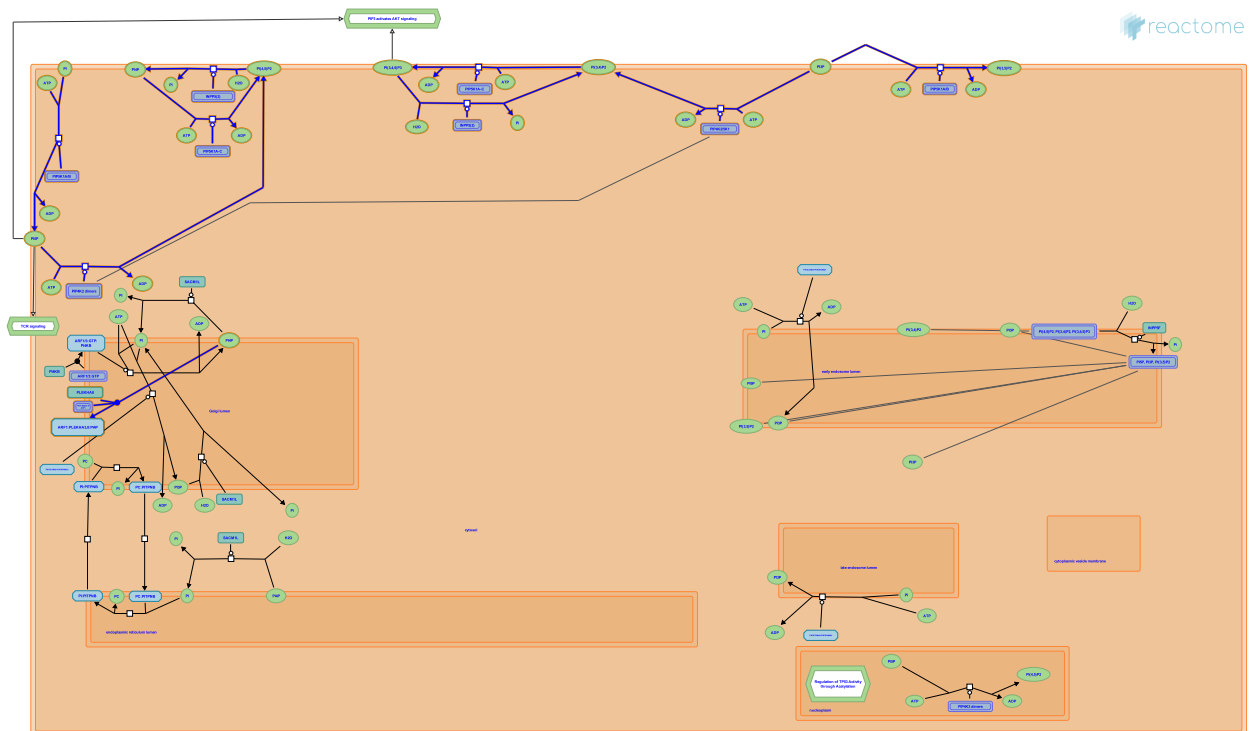
Reactome database release: 74

This document contains 1 pathway and 9 reactions ([see Table of Contents](#))

## Synthesis of PIPs at the plasma membrane ↗

**Stable identifier:** R-PFA-1660499

**Inferred from:** [Synthesis of PIPs at the plasma membrane \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## PI4P is phosphorylated to PI(4,5)P2 by PIP5K1A-C at the plasma membrane ↗

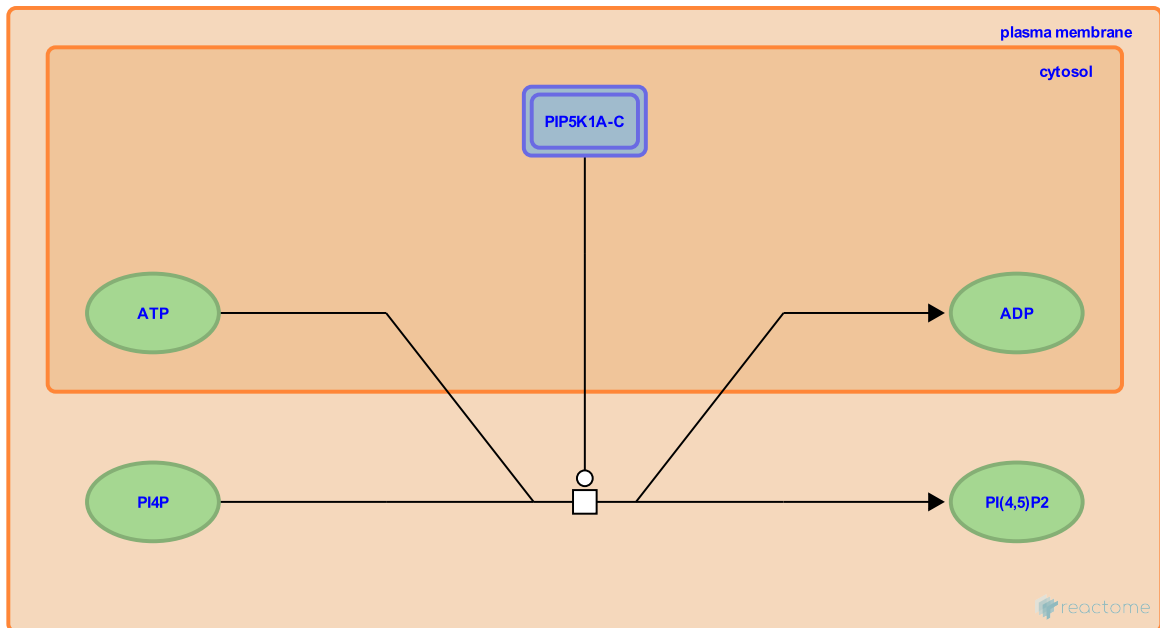
**Location:** Synthesis of PIPs at the plasma membrane

**Stable identifier:** R-PFA-1676082

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** PI4P is phosphorylated to PI(4,5)P2 by PIP5K1A-C at the plasma membrane (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** PI(4,5)P2 is dephosphorylated to PI4P by SYNJ/INPP5[1] at the plasma membrane

**Followed by:** PI(4,5)P2 is dephosphorylated to PI4P by SYNJ/INPP5[1] at the plasma membrane

**PI(4,5)P2 is dephosphorylated to PI4P by SYNJ/INPP5[1] at the plasma membrane** ↗

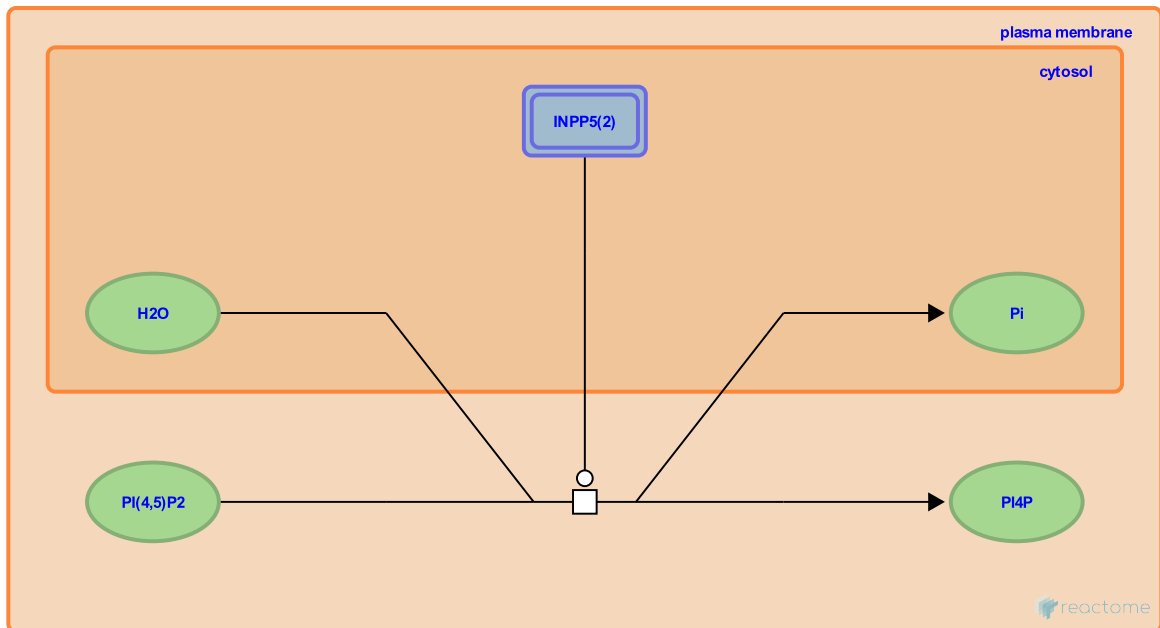
**Location:** Synthesis of PIPs at the plasma membrane

**Stable identifier:** R-PFA-1676177

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** PI(4,5)P2 is dephosphorylated to PI4P by SYNJ/INPP5[1] at the plasma membrane (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** PI4P is phosphorylated to PI(4,5)P2 by PIP5K1A-C at the plasma membrane, PI5P is phosphorylated to PI(4,5)P2 by PIP4K2 dimers at the plasma membrane

**Followed by:** PI4P is phosphorylated to PI(4,5)P2 by PIP5K1A-C at the plasma membrane

## PI(3,4)P2 is phosphorylated to PI(3,4,5)P3 by PIP5K1A-C at the plasma membrane ↗

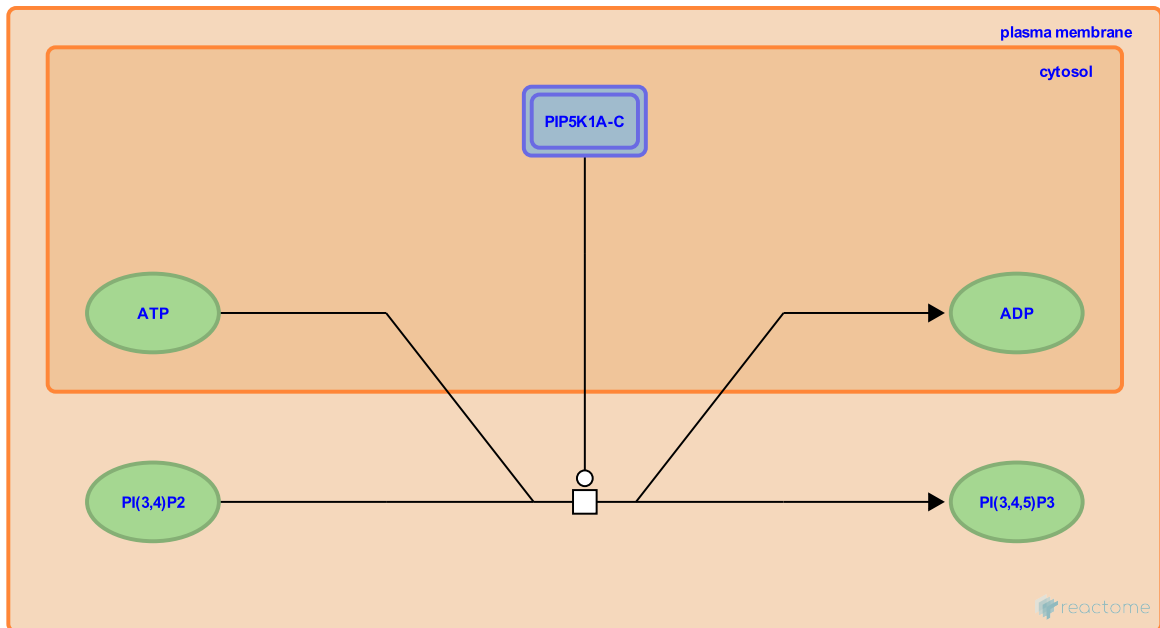
**Location:** Synthesis of PIPs at the plasma membrane

**Stable identifier:** R-PFA-1675773

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** PI(3,4)P2 is phosphorylated to PI(3,4,5)P3 by PIP5K1A-C at the plasma membrane (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** PI(3,4,5)P3 is dephosphorylated to PI(3,4)P2 by INPP5[2] at the plasma membrane, PI3P is phosphorylated to PI(3,4)P2 by PIP4K2/5K1 at the plasma membrane

**Followed by:** PI(3,4,5)P3 is dephosphorylated to PI(3,4)P2 by INPP5[2] at the plasma membrane

## PI(3,4,5)P3 is dephosphorylated to PI(3,4)P2 by INPP5[2] at the plasma membrane ↗

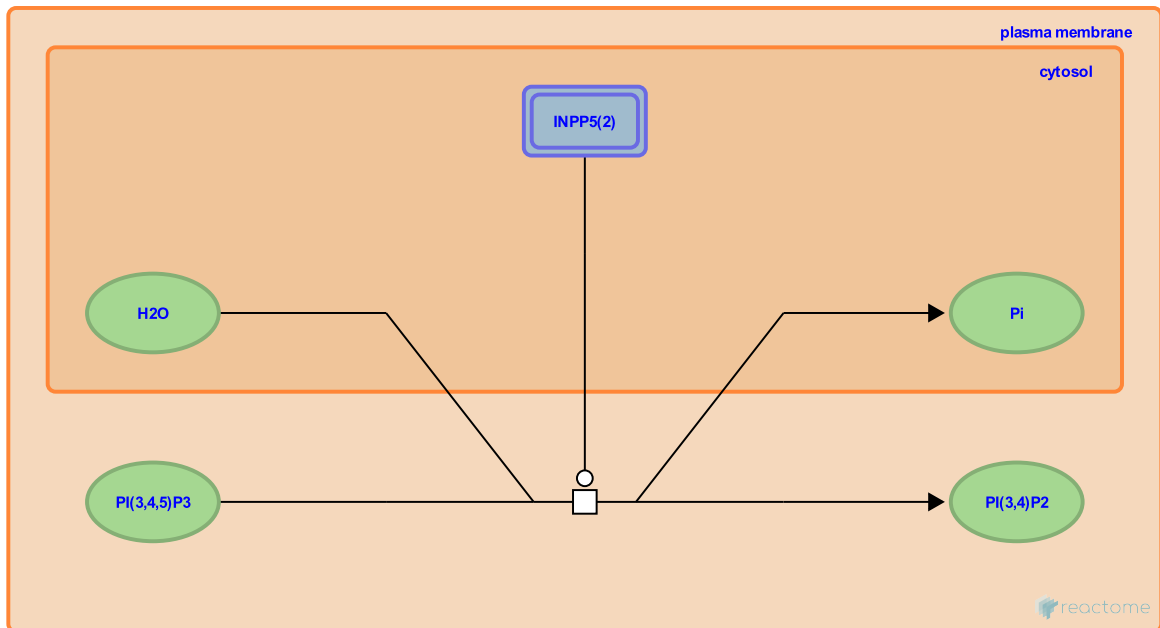
**Location:** Synthesis of PIPs at the plasma membrane

**Stable identifier:** R-PFA-1675949

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** PI(3,4,5)P3 is dephosphorylated to PI(3,4)P2 by INPP5[2] at the plasma membrane (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** PI(3,4)P2 is phosphorylated to PI(3,4,5)P3 by PIP5K1A-C at the plasma membrane

**Followed by:** PI(3,4)P2 is phosphorylated to PI(3,4,5)P3 by PIP5K1A-C at the plasma membrane

## PI3P is phosphorylated to PI(3,4)P2 by PIP4K2/5K1 at the plasma membrane [↗](#)

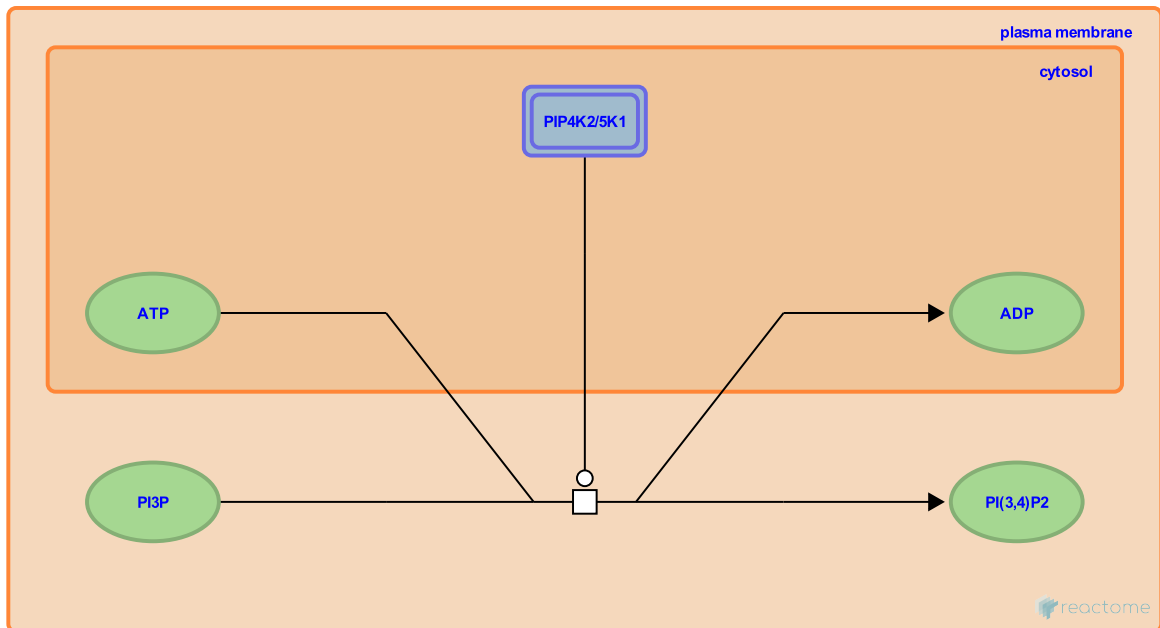
**Location:** [Synthesis of PIPs at the plasma membrane](#)

**Stable identifier:** R-PFA-1676145

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** [PI3P is phosphorylated to PI\(3,4\)P2 by PIP4K2/5K1 at the plasma membrane \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Followed by:** [PI\(3,4\)P2 is phosphorylated to PI\(3,4,5\)P3 by PIP5K1A-C at the plasma membrane](#)



## PLEKHA3,8 bind PI4P, ARF1 ↗

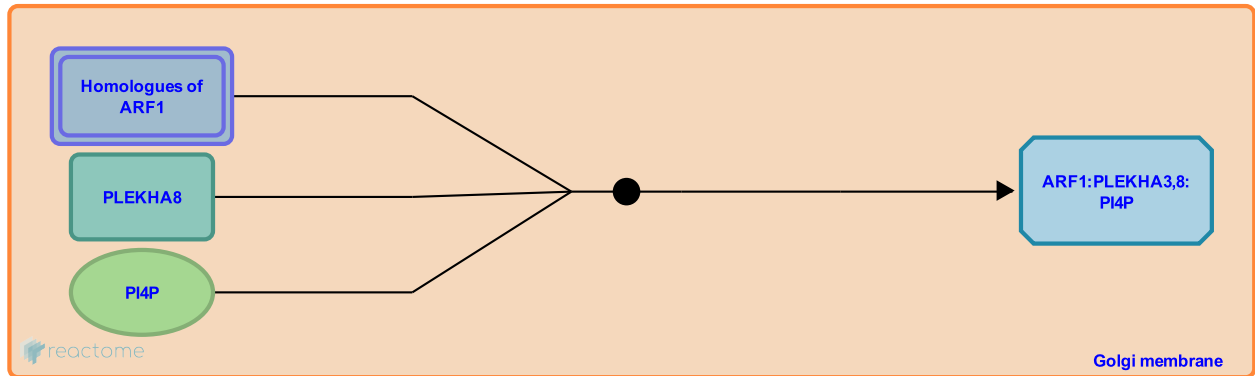
**Location:** Synthesis of PIPs at the plasma membrane

**Stable identifier:** R-PFA-8870499

**Type:** binding

**Compartments:** Golgi membrane

**Inferred from:** PLEKHA3,8 bind PI4P, ARF1 (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

## PI is phosphorylated to PI5P by PIP5K1A/B at the plasma membrane ↗

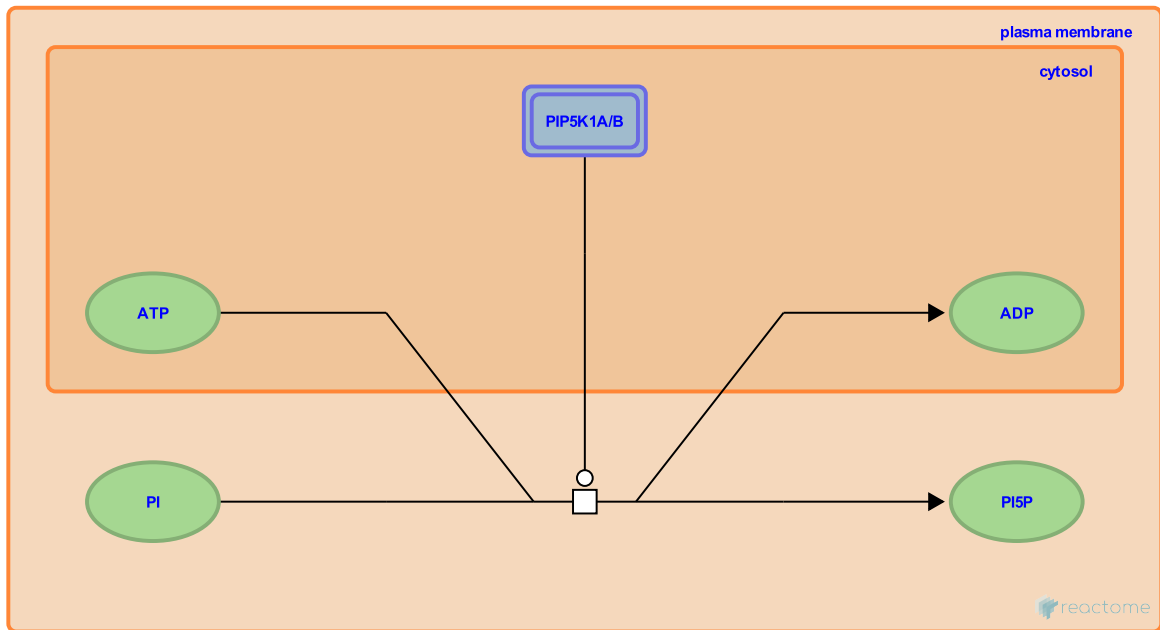
**Location:** [Synthesis of PIPs at the plasma membrane](#)

**Stable identifier:** R-PFA-1675810

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** [PI is phosphorylated to PI5P by PIP5K1A/B at the plasma membrane \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Followed by:** [PI5P is phosphorylated to PI\(4,5\)P2 by PIP4K2 dimers at the plasma membrane](#)



## PI5P is phosphorylated to PI(4,5)P2 by PIP4K2 dimers at the plasma membrane ↗

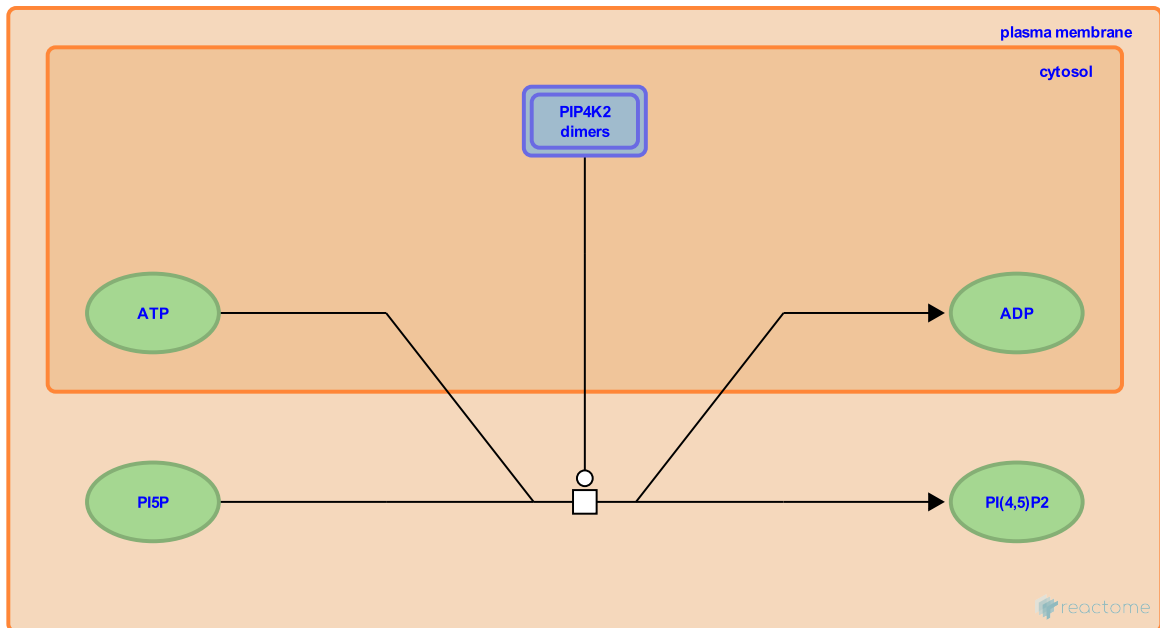
**Location:** [Synthesis of PIPs at the plasma membrane](#)

**Stable identifier:** R-PFA-1675776

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** [PI5P is phosphorylated to PI\(4,5\)P2 by PIP4K2 dimers at the plasma membrane \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](/electronic_inference_compara.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

**Preceded by:** [PI is phosphorylated to PI5P by PIP5K1A/B at the plasma membrane](#)

**Followed by:** [PI\(4,5\)P2 is dephosphorylated to PI4P by SYNJ/INPP5\[1\] at the plasma membrane](#)

# Table of Contents

Introduction	1
☰ Synthesis of PIPs at the plasma membrane	2
↳ PI4P is phosphorylated to PI(4,5)P2 by PIP5K1A-C at the plasma membrane	3
↳ PI(4,5)P2 is dephosphorylated to PI4P by SYNJ/INPP5[1] at the plasma membrane	4
↳ PI(3,4)P2 is phosphorylated to PI(3,4,5)P3 by PIP5K1A-C at the plasma membrane	5
↳ PI(3,4,5)P3 is dephosphorylated to PI(3,4)P2 by INPP5[2] at the plasma membrane	6
↳ PI3P is phosphorylated to PI(3,4)P2 by PIP4K2/5K1 at the plasma membrane	7
↳ PLEKHA3,8 bind PI4P, ARF1	8
↳ PI is phosphorylated to PI5P by PIP5K1A/B at the plasma membrane	9
↳ PI3P is phosphorylated to PI(3,5)P2 by PIP5K1A/B at the plasma membrane	10
↳ PI5P is phosphorylated to PI(4,5)P2 by PIP4K2 dimers at the plasma membrane	11
Table of Contents	12